

# The CENTRE

Food Processing Development Centre

Centre for Agri-Industrial Technology  
Food Science & Technology, Brooks  
Food Processing Development Centre

November 2001

## Branch Head's Message



FPDC Branch Head Ron Pettitt (left) conferring with Site Superintendent Mark Wiltzen of Maple Reinders Construction.

### AVEC - New Direction

The former Agriculture Value-added Engineering Centre (AVEC) will now be known as the Centre for Agri-Industrial Technology (CAIT).

As part of our department's review process, a paper entitled "Developing a Non - Food Processing Industry in Alberta" was prepared by Division staff and submitted for consideration.

Alberta is strategically positioned to take advantage of opportunities in non-traditional agricultural processing, including:

- Opportunities in agriculture products as input substitutes in manufacturing and consumer products (i.e. bioplastics)
- Creation of new markets based upon new developments in agriculture processing (i.e.: industrial enzymes)
- New uses for agriculture materials for cosmetic and health care applications.

These opportunities will not be accomplished without a coordinated effort on behalf of industry, the research community and government. In order to focus our efforts on these opportunities, the mandate of the former Agriculture Value-added Engineering Centre (AVEC) has been expanded. The new name for this unit, the "Centre for Agri-Industrial Technology" (CAIT) is intended to reflect this enhanced mandate. While continuing to provide engineering services related to value added processing and the post harvest handling of crops, CAIT will evaluate other opportunities for the growth of Alberta's agri-food industry.

Over the past six months a significant amount of new and re-conditioned equipment has been purchased for

CAIT operations. The processing equipment includes a Carter Day cylinder separator, a Carter Day precision sizer, a Vincent horizontal screw press, a Codema impact huller, a Satake pearler, a Renn roller mill and a WP twin screw extruder. New analytical instrumentation includes a Brookfield digital viscometer, a vacuum oven and a Forefront Graphics imaging system. This equipment combined with the equipment previously acquired by AVEC provides CAIT with the basic tools required to fulfill their mandate.

CAIT is staffed with experienced personnel with the skills and ability to provide a wide range of services to Alberta's agricultural processing industry. These services include the post harvest handling of crops, environmental issues and the development of industrial products. CAIT will compliment the value added developmental work done by the other Food Processing Development Centre operations in Leduc and Brooks.

### Food Processing Development Centre Expansion

Over the past few years, we have been operating to capacity at our Leduc facility, both in the pilot plant and product development laboratory. With the expansion complete, our processing and product storage areas are almost doubled. We have acquired a significant number of major equipment pieces to complement the services we currently offer to our clients.

Finally, we have added several staff members to the FPDC team over the past few months. They are briefly profiled in this newsletter.

We are all looking forward to working in our expanded space and to providing the Agri-Food industry with better services than ever before.

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## Food Processing Development Centre – Bigger and Better

On October 12, 2000, construction equipment belonging to Maple Reinders Incorporated quietly arrived at the east end of our building and stripped the sod from an area about 60 feet by 100 feet to begin the year-long process of expanding and renovating the Food Processing Development Centre. The east addition now houses the new freezer, cooler, bakery, loading dock, dry storage, seminar room, offices, and lunch area. A second expansion on the south wall contains new cool packaging areas. Renovations include major changes on the mezzanine level and sensory evaluation areas.

The new spaces dramatically extend the scope of the services we can provide to our clients. We now have a separate room for bakery processing. It contains the mixer,

*Koppens Tunnel Oven*

dough sheeter, proofer, Baxter oven, two small fryers, and the Dough Boy packaging machine. "This is the first time we've been able to locate all the bakery equipment in one room," says the Centre's bakery scientist, Lorea Ladner. "We can arrange steel work tables in whatever configuration is the

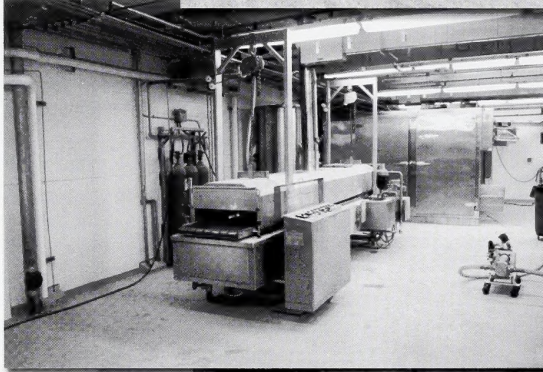
most efficient for the application we need, and we'll be able to accommodate more than one client at a time in this new area." The bakery is adjacent to the new freezer and cooler for convenient access to ingredients, and the dry storage room is located around the corner. "We can weigh ingredients, mix, roll dough, fry, bake, package, and ship - all without having to cross through other areas of the plant, and this really helps with quality control," as Ladner points out. Several significant changes will improve operations in the meat processing areas. A wall has been added to the main-floor meat room, which creates a corridor running the length of the pilot plant. This wall isolates the meat room from the other areas so that the chance of cross-contamination can be minimized. The

former cool packaging room is now a second raw meat room, and because it is separated from the adjoining room, we can process more than one type of raw meat at the same time. Each room contains a cooler and freezer. In addition to the meat rooms on the main floor, the mezzanine houses two

temperature-control (refrigerated) rooms. One of these is used for preparation of battered or coated products. It contains the Koppens forming machine, the Stein drum breader, Koppens the pre-duster, batter applicator and breadng applicator. From this room, product passes on mesh belts through to the fryer or our new Koppens tunnel oven, and then into the spiral freezer which was moved to accommodate the renovation. Once out of the spiral freezer, the mesh belt moves product into a second refrigerated room where it can be packaged. Robert Myers, one of our technologists who works with many of our clients who use this equipment sums it up. "Having these new cold rooms at each end of the heat processing will help eliminate many of the quality control problems we've had," he says. "Meat is much easier to form when it's colder, and you get a better bind of the breadng to the meat. Refrigeration during the forming and battering process also eliminates the microbial hazard that we'd have during the half-hour or more that it takes to run raw meat through the former and breader." Once the frozen product is packaged, it can be moved directly to the shipping area on the new elevator.



*East expansion taken from North side of FPDC*



*(L to R) Jimmy Yao, Engineer, Peter Davies, Facilities Manager, Dave Forster, Millwright, conferring about the best way to install the tunnel oven*

The Centre's addition boasts vastly improved freezer and cooler facilities. The new freezer more than

doubles our freezer capacity, and is conveniently located close to the shipping area. An adjacent cooler is almost as large as the freezer.

Dry storage areas are now located at three strategic areas in the pilot plant. One is on the main floor, close to the loading



dock and elevator. Two additional dry storage rooms are located on the second floor, one at each end of the mezzanine. Our mill room has done double duty as dry storage for some time now, so the new storage rooms not only enable our staff and clients to store materials closer to their work areas, but will also give us more efficient access to the milling room and its equipment.

The large wet processing area remains the same, although the smokehouse, which has been upgraded, has been relocated a few feet. The two cool packaging rooms, constructed in the south addition, now adjoin the wet processing room and share a walk-through cooler.

Our new wash bay, about the size of a single-car garage, is located at the south end of the wet processing room, away from traffic areas in the plant. This wash bay is accessed from the pilot plant as well as from outside by an overhead door.

Our sensory evaluation laboratory has been relocated and expanded. The controlled atmosphere panel room houses ten booths equipped with computerized data collection stations. "This new facility allows for more efficient and standardized experimentation," says Karen Erin, our sensory evaluation scientist. "We have installed an integrated data analysis system, which allows us to provide our clients with top line results quickly." The new preparation area contains a computerized data logging system, six burner stove, convection and microwave ovens, refrigerator and freezer storage, and access to an institutional grill and fryers. The sensory lab has convenient access to a seminar room for group discussion and panel training. This new laboratory, in

conjunction with our downtown Edmonton Consumer Product Testing Centre further expands our ability to offer our clients consumer-central location and home placement panels, and trained panel research services.

## New Equipment

In conjunction with the renovations at the Centre, we have acquired several new pieces of equipment. In addition to the tunnel oven now installed on the mezzanine, new equipment includes a Fomax former for the meat room, with plates for nuggets and patties. A flaking mill has been installed next to the twin screw extruder so that extruded product can be flaked, either with or without heat. Our new spray dryer has applications for any liquid. The volumetric filler replaces our older piston filler. The ultrafiltration membrane system is constructed with spiral-bound membranes rather than the plate-and-frames of our older unit. "This system makes it much easier to change the

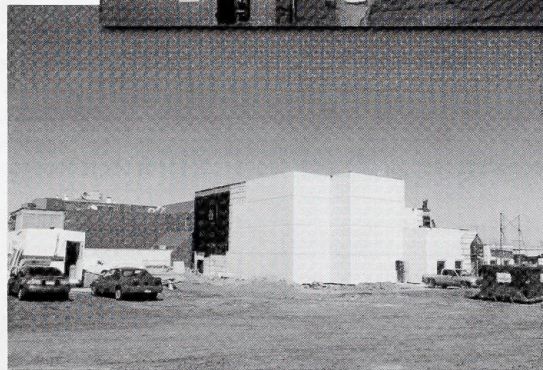
membranes, and gives us more flexibility in application," says dairy scientist Jacqueline Martin Lopez. We also have a new High Temperature Short Time Pasteurizer, which is ideal for dairy applications, but can also be used to pasteurize juices.

In the product development laboratory, we have acquired a High Performance Liquid/Gas Chromatograph, which will allow the Centre to analyze small compounds such as nutraceuticals. The Instron Universal Testing Machine has been upgraded with computer software, which enhances our ability to provide shelf life and other studies.



*Technologist Gabe Chemello outside our new cooler.*

*Technologist Bob Myers using the piston filler*



*Expansion - East end of FPDC  
Houses loading dock, cooler, freezer, office space, seminar room, dry storage area and lunch room*



# Welcome to . . .

## Carla Brenner, Processing Technologist



Carla Brenner joined the staff of the Centre for Agri-Industrial Technology as a Processing Technologist in August of 2001. Her responsibilities will include technical assistance to the other engineers and scientists. Brenner will oversee the sorting/milling plant, she will be the contact and resource person for the Centre's HACCP program, and she will be responsible for acquisition of supplies and equipment.

Other activities include testing and measurements, data acquisition, and fabrication and modification of research materials and supplies.

Ms. Brenner is a recent graduate in Agricultural and Bioresource Engineering from the University of Saskatchewan. "My degree deals with patterns of relationships among organisms and their environments and engineering design to develop processes and systems that influence, control, or utilize biological materials and organisms for the benefit of society." Ms. Brenner has a diverse range of design and industry experience. She designed a portable saskatoon berry precooler, an irrigation system of wastewater for treatment using soils as the filter, a drying process for wild mushrooms, and a research study of submerged biological filtration for small-scale fish storage tanks.

## Marivic Hansen, Laboratory Technician



Marivic Hansen is not a stranger to our staff, having joined Darcy Driedger and Les Dowdell at the Food Science and Technology Program in Brooks after several years of project work there. "Over the past few years, I've been working on the evaluation of organoleptic characteristics of four saskatoon berry cultivars for commercial processing, identifying which cultivar is best

suited for products such as jam, jelly, syrup, or pie fillings," she reports. Hansen also carried out controlled atmosphere storage and modified atmospheric packaging studies, hoping to improve the shelf life of the berries.

Another project involved development of a liqueur base using a tropical fruit puree. A third recent project reveals the extent of Marivic's competence with lab equipment. She measured the rheological properties of a widely used batter mix, looking at viscosity with a number of different instruments.

Hansen graduated with a B.S. in Civil Engineering from Luzon Colleges in the Philippines. She followed that with a Materials Engineering and Quality Control certificate, and held several engineering posts before coming to Canada in 1988. Prior to joining CDGS, she was the Senior Laboratory Technician at Lakeside Research Lab, and worked with Plains Perforating Ltd.

In addition to her career, Ms. Hansen has dedicated many hours of volunteer work at the schools and community organizations in Brooks.

## Kathleen Bunnin, Meat Scientist



Ms. Bunnin joined the staff of the Food Processing Development Centre in August, 2001. As a Meat Scientist, she will be involved with the development of new meat products, together with the other members of the Meat Processing and Product Development Team.

At the University of Alberta, Ms. Bunnin participated in a beef research project under Dr. Eileen LeBlanc. After that, she completed the IASTE Practicum, which is a technical exchange program, at the University of Giessen in Germany. She worked on fat, protein, and moisture analysis in milk.

Most recently, Ms. Bunnin spent two and a half years working with Sepp's Fine Foods (Savoury Products), where she was Product Development Manager for such items as sausage rolls and meat pies.

Ms. Bunnin's community involvement includes leadership with the Girl Guides of Canada, and she is a 2001 recipient of the Duke of Edinburgh Award.

## Alden Worobec, Processing Technologist



Alden Worobec, Processing Technologist, joined our staff in April 2001. He will be primarily involved with the Meat Processing program at the Centre.

Mr. Worobec brings fifteen years of strong industry background, particularly in developing commercial processing techniques and transferring technology in the meat and food industry. He has worked extensively with local, national, and international companies.

Most recently, Worobec spent four years with Harimex Inc., where he was responsible for development of Fibrimex processed products for the meat, poultry and seafood industries. He developed processing procedures and scale-up requirements for commercial production.

Mr. Worobec is well versed in the acts, regulations, and HACCP guidelines related to the meat and food industry. He has completed the first year of a B.Sc. program, and holds a Meatcutting Certificate from the Saskatchewan Institute of Applied Science and Technology.

At the Food Processing Development Centre, Mr. Worobec will provide technical support and technology transfer, primarily for the Meat Processing program. He is well qualified to help our clients meet their goals.



## HOKKAIDO EXCHANGE

Japan is an important trading partner for Alberta, and providing commodities desirable to Japanese consumers has been a goal for many years. Now, the Food Processing Development Centre in Leduc has established a partnership with the Hokkaido Food Processing Research Centre in Japan. It's a good way for both of us to help meet the needs of consumers as well as processors.

From April until August of 2001, we had Tsutomu (Tom) Abe from Hokkaido working with us at the Food Processing Development Centre in Leduc.

Abe is a Meat Scientist with the Hokkaido Food Processing Research Center in Japan, and he's working on the second phase of a project with Marek Gierus. Marek explains the initial work. "Meat snacks are gaining in popularity, with sales up 44% to over \$243 million U.S." he notes. "We

looked at consumer expectations for the North American as well as the Japanese market, and identified several product concepts. Then we looked at what technologies might be suitable for developing the products."

Abe arrived in April to begin the first phase of the joint project. "My role is to help evaluate the technologies that could be used to develop meat snacks," he says. "At our Hokkaido Food Processing Research Center we don't have any production capabilities, and the Leduc facility is ideal for this kind of work." Abe and Gierus worked with traditional drying techniques, extrusion techniques, osmotic drying, and the use of humectants. They developed a number of meat snacks using various methods.

For the next phase of the project, Marek Gierus is working at the Hokkaido Food Processing Research Center in Ebetsu. "We'll evaluate various vacuum drying and vacuum frying technologies to manufacture shelf stable beef products. Japanese consumers are very health-conscious, so we'll also investigate methods of formulating snacks which will meet the demand for functional foods, targeted for the health food market." The results will be presented to the industry when that phase is finished.

Aside from the success of the work they completed at our Food Processing Development Centre, Tsutomu says he's met some additional objectives. "Working in English was quite a challenge for me," he says, "but after four months, it's much easier. Another thing I wanted to do was to learn about your Centre and how it operates." With the construction on our expansion underway during Tsutomu's stay, he had a first-hand look at some of our new equipment and its capabilities. And finally, he enjoyed a few rounds of golf, as well as a successful fishing trip and some weekend trips to the mountains.

Marek Gierus will be in Japan from August 2001 until January 2002 to work on the next phase of this project.



*Tsutomu Abe with his samples*





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## *focus on . . . .*

## THE FOOD SCIENCE AND TECHNOLOGY PROGRAM, BROOKS



**Marivic Hansen, B.Sc. (Left)**  
**Darcy Driedger, Ph.D. (Centre)**  
**Les Dowdell, M.Sc. (Right)**

The Food Processing Development Centre includes our three staff members who are located at the Crop Diversification Centre South, in Brooks.

Managed by Dr. Darcy Driedger, the unit is ideally situated to work in partnership with Crop Diversification Centre scientists who grow test plots of a wide variety of small fruit, vegetable, and special crops such as herbs.

This summer, for example, Driedger carried out a small project with the Potato Agronomy Program at CDCS. The project was targeted to growers who produce table potatoes. Driedger reports that "The spud crew grew 45 varieties of potatoes as a demonstration project to show growers what types of varieties are available. There were russets, white-skinned, red-skinned, and purple-skinned potatoes. Flesh colors ranged from white to yellow to even a few blue varieties. The food lab evaluated the boiling and baking quality of each variety. Because it was an early harvest and many of the tubers were small, they tended to boil better than they baked. Nevertheless, we identified several varieties that we really liked."

Good boilers included AC Ptarmigan, Agata, Adora, Cherry Red, Norland and Purple Viking. Good bakers included Eramosa, Morning Gold, Ruby Gold, Umatilla, Vivaldi and Russet Norkotah.

On July 31, more than 100 people attended the "Fresh Market Vegetable and Potato Producer's Field Day" at CDCS, organized by Drs. Paul Ragan and Michele Konschuh. Participants were able to see the potato plants in the field along with harvested tubers and the results of the cooking trials. "We thought it was big success," says Driedger.

This project is typical of the work carried out by the Food Processing Development Centre staff in Brooks, who work closely with CDCS scientists to monitor the frying, chipping, boiling and baking quality of new potato cultivars.

"We are well equipped to assist with most fruit and vegetable product development," says Driedger. "Our equipment includes a juicer, slicer, blast freezer, vacuum packager, and other processing equipment suitable for fruits and vegetables. We also have access to CDCS's controlled atmosphere storage facility, which is unique to western Canada."

Les Dowdell is our Analytical Chemistry Technician, and he carries out a wide range of analyses. "For example," he notes, "a number of herb crops can successfully be grown in southern Alberta, such as mint, basil and coriander. We can provide an analysis of their essential oils to provide data which helps optimize production of flavour ingredients." Dowdell is frequently called upon to provide analytical support for other scientists who are working on product development projects. He spent several months over the winter on a quality control project at the Food Processing Development Centre in Leduc.

Marivic Hansen provides a wide range of technical expertise to the food processing and technology program in her role as laboratory technician. Trained as a civil engineer, Marivic is very comfortable with the laboratory equipment and the research she carries out. She also brings experience with sensory evaluation techniques to the food science team at Brooks, in addition to her work in the product development area. Marivic is profiled on page four.